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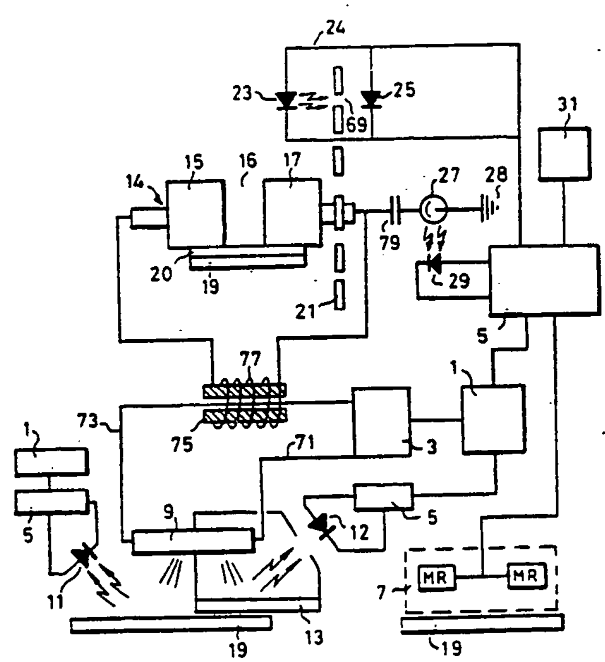
(54) Title: BANKNOTE COUNTERFEIT DETECTING APPARATUS

(57) Abstract

A counterfeit detection apparatus for banknotes and other valuable document is described comprising a DC power supply (1) which supplies a high frequency power supply (3), with its own discrete 5 volts, to a circuit board (5) containing logic circuitry and signal conditioning circuitry and a single chip processor. The power supply (3) is connected to a UV lamp (9) and a metallised thread detector (14) formed by a pair of metallic rollers (15, 17) which roll across a banknote (19) to detect the conductivity of a metallised thread in the banknote (19). A drive from rollers (15, 17) rotates an encoder disc (21) the rotational movement being monitored by a pair of photodiodes (23, 25). The apparatus includes means for detecting the amount of UV absorption and electro-mechanical means for autoreferencing the lamp's intensity. Displays (31) are provided to give a visual or audible verification of the authenticity of the banknote (19).



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BANKNOTE COUNTERFEIT DETECTING APPARATUS

This invention relates to a paper composition, magnetic code and thread detecting apparatus for valuable documents such as banknotes and more particularly to the detection of Ultra Violet (UV) radiation absorption, magnetic ink printing and metallised threads contained on or in the banknote paper.

All British and the majority of foreign banknotes have various security features contained on or in them. The authenticity of these banknotes can be verified by checking the presence or absence of these features.

To the public the only means of verification is to use eyesight. Modern printing technology has made these features visually easy to counterfeit such that these counterfeits cannot be detected by human sensory means. The present invention proposes to verify these features electronically ie whether the paper absorbs UV in certain areas of the note, whether magnetic ink is in certain areas of the note and to check the conductivity of the thread.

Various problems arise when trying to check these

features electronically, firstly the UV lamp has to be mains powered, secondly the amount of UV absorption varies depending on how dirty the note is and thirdly the detection is compromised because the lamp intensity varies with time. Fourthly the magnetic ink has to be in specific areas of the note and fifthly the metallised thread can exhibit extremely low conductivity which our British Patent Application No. 8723387 overcomes. These problems always result in existing counterfeit detecting machines being bulky and expensive.

An aim of the present invention is to provide a counterfeit detecting apparatus for banknotes which overcomes these problems, so that a device small, inexpensive and reliable enough can be manufactured so that a hand held verifier is a possibility and the device, because it is small, inexpensive and reliable could also be included in other document accepting devices such as change machines, automatic credit banking machines and the like.

According to the present invention there is provided a counterfeit detection apparatus for banknotes comprising a high frequency power supply, electrical connecting means to connect the high frequency supply to the UV lamp and a metallised thread detector means for detecting the amount of UV absorption, electro-mechanical means for autoreferencing the lamp intensity, means for detecting the conductivity of the metallised thread, means for magnetising magnetic ink and means for detecting the presence of magnetic ink.

Also provided are timing means and a single chip processor for process control and for determination of features in particular areas of the note including crude pattern recognition.

Embodiments of the counterfeit detecting apparatus will now be described, by way of example only, with reference to the accompanying drawings in which:

Figure 1 is a diagrammatic view of a first embodiment according to the invention;

Figure 2a is a diagrammatic view of the UV and thread detecting sytems of a first embodiment according to the invention;

Figure 2b is a sectional view taken along the line B-B of Figure 2a through the UV autoreferencing system of a first embodiment according to the invention;

Figure 2c is a sectional view taken along the line A-A of Figure 2a through the UV absorption detecting system of a first embodiment according to the invention;

Figure 3a is a diagram of the UV and autoreferencing signals shown increasing of the first and second embodiments according to the invention;

Figure 3b is a diagram of the UV and autoreferencing signals taken over a short period of time of the first and second embodiments according to the invention;

Figure 3c is a diagram of the UV and autoreferencing signals of a genuine UV dull banknote of the first and second embodiments according to the invention;

Figure 4 is an isometric view of the timing system of a first embodiment according to the invention;

Figure 5a is a diagram of the timing and magnetic signals of the first and second embodiments according to the invention;

Figure 5b is a diagram of the timing and magnetic signals of the first and second embodiments according to the invention;

Figure 5c is a diagram of the timing and magnetic signals of the first and second embodiments according to the invention;

Figure 6 is a diagrammatic view of a second embodiment according to the invention.

Referring to Figure 1 the counterfeit detecting

apparatus according to the first embodiment comprises a DC power supply 1 which supplies the high frequency power supply 3 with its own discete 5V and also supplies 5V, +12V and -12V to the circuit board 5 which contains the logic circuitry, signal conditioning circuitry and the single chip processor. The circuit board 5 also handles the power distribution to discrete sensors.

The apparatus also comprises a magnetic ink detector head 7 similar to the MURATA Manufacturing Co Ltd.'s BS05C1HGCA Pattern Recognition Sensor (R) comprising a pair of semiconductive magnetic resistors and an integral permanent magnet.

The apparatus also comrpises a shortwave UV lamp 9 monitored by a pair of silicon photodiodes 11 and 12. Photodiode 11 measures the amount of UV absorption by the banknote 19 and the photodiode 12 measures the amount of absorption by the reference 13 and hence monitors the intensity of the lamp 9.

The apparatus also comprises a thread dectector 14 formed by a pair of metallic rollers 15 and 17 which roll across the banknote 19 and also provide the drive 65 via belt 67 (see Figure 4) for an encoder disc 21 whose rotational motion is monitored by a pair of photodiodes 23 and 25, the photodiode 23 being an emitter and the photodiode 25 being a receiver. The output from the photodiode 25 provides a timing signal 63 (see Figure 3b) which is fed into the single chip processor via the logic circuitry 5 so that signal 81 from the magnetic head 7 and the photodiode 11 can be interrogated and compared. The thread detector 14 is also connected to a gas discharge lamp 27 which is monitored by a photodiode 29.

Displays 31 are also provided for operator information, to give visual verification of pass or fail.

The apparatus according to the first embodiment is generally but not exclusively suited to a hand held device.

Referring now to Figure 2a. the high frequency power supply 3 comprises a simple tuned oscillator circuit 33 which creates the approximate 2MHz frequency necessary to switch the current on and off via the primary coil 35 and the switching coil 37 wound around ferrite core 39. Also wound on the core 39 is the secondary coil 41 which supplies approximately 170V at 2MHz to the UV lamp 9 via conductors 71 and 73. The supply of 170V at 2MHz is extremely low current and hence safe.

The 170V 2MHz supply is connected to either end of the UV lamp 9 by close fitting metal rings 41 and 43 which form two plates of a capacitor, with the mercury vapour inside the quartz lamp acting as the dielectric. The application of the 170V 2MHz causes electrons to flow through the vapour and these electrons excite the mercury atoms so that they emit a predominance of shortwave UV radiation in the region of 254 nanometres.

This radiation when hitting certain substances causes the substance to absorb the UV and fluoresce, ie be reemitted at a longer wavelength. This wavelength depends on the substance.

Non secure documents are generally treated with a blue enhancer which causes the paper to emit a high amount of white light when bombarded with UV. However secure and valuable documents such as banknotes are what is commonly termed UV dull, ie that they do not, when bombarded with UV, emit a high amount of white light and this feature can be checked. Also secure documents can have certain areas treated with prosphors that do fluoresce against a dull background and this can also be checked. However dirty documents and unstable UV sources compromise the checking of these features.

To overcome the problem of the lamp intensity drifting a mechanical reference 13 is provided inside a housing 45 which is made light tight by a cover 47. It is important that the reference 13 is made from a material

that is UV stablised such as phosphur coated glass. The lamp 9 also runs through this light tight compartment 49. Also provided in this compartment 49 is an aperture 51 which allows emitted light from the reference 13 to be detected by the photodiode 12 as can be seen in Figure 2b.

Also provided in housing 45 is a second compartment 53 which is open at its base such that UV radiation from the lamp 9 also contained can hit the banknote 19. Also provided in the compartment 53 is an aperture 55 which allows emitted light from the banknote 19 rto be detected by the photodiode 11: this can be seen in Figure 2c. The photodiode 11 like photodiode 12 is in communication with the single chip processor via the circuitry 5.

Referring now to the Figure 3a the reference signal 57 from the photodiode 12 which monitors the UV absoption on the reference 13 and hence the lamp intensity is varying with time, this signal 57 may go up or down or up and down. For illustration purposes the signal 57 is shown increasing.

If this refernence signal is increasing then it follows that the signal 59, ie the amount of white light emitted from the banknote monitored by the photodiode 11, is also increasing. The signal 59 is shown below the signal 57 but may as equally be above it. Figure 3a shows the general drift of UV output over an extended period of time and shows that signals 57 and 59 will follow each other and overcome the problem of UV instability.

The graph at Figure 3b shows an example of the reference signal 57 and the banknote signal 59 taken over a relatively short period of time equal to that required to traverse the banknote, generally less that 1/4 second. Also shown superimposed is the timing signal 63. The magnitude of the reference signal 57, ie the threshold by which signal 59 is compared, is set externally by a variable resistor. This is particularly useful when interrogating documents from other countries, which may

have nominally different levels of UV dullness. The graph at Figure 3b has for its horizontal axis distance which equates to distance along the banknote. As the apparatus moves over the banknote the signal 59 varies in amplitude with differing amounts of UV dullness, but as the photodiode 11 goes over a bright part of the banknote, the signal rises at 61 above the reference signal 57, if the banknote should be dull this would be determined a counterfeit.

This overcomes the problem of dirty notes as it is known that the note should be totally dull and the slightest amount of cross over of the reference signal 57 by the signal 59 indicates a counterfeit. This is particularly useful when interrogating photocopies, since it is the amount of emitted white light from the paper which is being monitored and a high proprtion of the emitted white light is Infra Red. Because the Infra Red is emitted from the surface of the paper it travels up through the ink or carbon and is absorbed by it. The signal 59 would therefore be appreciably lower and to the electronics could look UV dull.

With this system of any small amount of cross over being seen as counterfeit it is impossible to forge a note such that it does not have at least one bright portion.

Figure 3b also illustrates what happens when a banknote containing UV bright security features is being interrogated. Let us assume that the banknote should have a bright feature at pulses timing 65 and 67. The signal 59 when compared with the data stored in the single chip processor ie that a bright feature should be present at pulses 65 and 67, shows that the banknote is genuine. If cross over of signal 57 by signal 59 occurs at any other pulses this would be determined counterfeit.

Figure 3c shows the signals 57 and 59 from a genuine UV dull banknote, ie no cross over.

Also shown in Figure 2a is the thread detector which

comprises a 2MHz power supply 3 which can supply up to 200 volts to a pair of detection rollers 15 and 17. The best results are however found to work with a voltage of 5 volts because it is more stable, noise immune and safer. This 5 volts is generated by taking a tapping off of either conductor 71 or 73 form secondary coil 41 which supplies UV lamp 9. This tapping comprises a coil 77 wound around a ferrite core 75 which surrounds either conductor 71 or 73. The detection rollers 15 and 17 form the plates of a high value capacitor with the air gap 16 between them forming the dielectric, this capacitor is in series with a second capacitor 79. This capacitor 79 is connected to a gas discharge lamp 27 which is sensed by a photodiode 29 and is earthed at 28. A banknote 19 having a metallised strip 20 is passed under the capacitor rollers 15 and 17 and the gas discharge lamp 27 illuminates if the metal strip is of the correct conductivity.

The product of the two capacitors in series can be calculated as follows:

$$C\ TOTAL = \frac{C1 \times C2}{C1 + C2}$$

If the metal strip is not present the C TOTAL value is high but when a strip is present between rollers 15 and 17 the C TOTAL value is small allowing current to flow through the gas discharge lamp 27 thus allowing the presence of the strip 20 to be detected by the photodiode 29.

It is believed that the 2MHz sinusoidal signal goes through roller 15 when the roller is in contact with the metal strip 20 or with the banknote paper covering the metal strip 20 and is induced into the metal thread as well as into the roller 17. The contact picks up the 2MHz

signal which is amplified and detected.

The rollers 15 and 17 have a combined value of capacitance the resonant frequency of the system being determined by the value of capacitance of the rollers to determine whether the thread in the banknote is present.

Referring now to Figure 4, the rollers 15 and 17 are carried on a non conducting shaft 65 which provides a friction drive for belt 67 which is in frictional contact with boss 66 connected to encoder disc 21. The encoder disc 21 is provided with slots 69 around its periphrey which move through slotted opto 24 which houses photodiodes 23 and 25.

As the rollers 15 and 17 traverse the banknote the encoder disc 21 via belt 67 will rotate, this will cause the continuous make or break of photodiode 25 and via signal conditioning contained in circuitry 5 will product the timing signal 63.

The system of an encoder disc 21 and slotted opto 24 may equally be replaced by a commercially available rotary encoder.

An advantage of this system is that the friction drive to the rollers 15 and 17 is provided directly from from the banknote 19 and therefore the timing signal 63 is a direct indication of the position of the apparatus along the banknote, which is particularly useful for the determination of presence or absence of features in particular areas of the banknote.

Referring now to Figure 1, the apparatus is also provided with a magnetic ink detector 7. This device 7 is commercially available and contains standard technology.

However, experimentation has shown that photocopies containing carbon black can also be magnetised and read by this device, this causes problems in the authentication of banknotes.

For true authentication it is required to determine that particular magnetic features appear in particular

areas of the banknote. This is extremely difficult to achieve in a low cost hand held device and to this end is provided the timing signal 63 and various logical arguments.

Referring now to Figure 5, shown is a banknote 19 containing a magnetic serial number at 89 and 91 and a printed non-magnetic feature at 93. The serial number is shown separated for clarity but may equally be continuous.

When the banknote 19 passes the apparatus the timing signal 63 is generated via the rollers 15 and 17 in contact with the banknote. When feature 89 passes the device 7 the signal 83 is generated. This signal 83 initialises the single chip processor to compare the subsequent data. The single chip processor is now looking for a signal 85 to be present at the block of timing pulses 95 and not to be present at the block of timing pulses 97. If this is so the banknote is genuine.

If the document were a photocopy of a banknote then the features 89, 91 and 93 would all be carbon black. In this instance the signal at 5b would be generated with extra signal at 87 and the banknote determined counterfeit. This would equally apply if magnetic ink was used throught the forgoing process.

If the document were a high quality reproduction of a banknote but contained no magnetic features at 89 and 91 then the signal at 5c would be generated without signals at 83 and 85 and the banknote determined counterfeit.

The second embodiment shown in Figure 6 is similar to that shown in Figure 1 where like parts have the same reference numerals. In the second embodiment the short wave UV lamp 9 has been replaced by a long wave UV lamp 100. in this instance the inner surface of the quartz tube has been coated with a phosphor to convert the 254 nanometre short wave UV to 367 nanometre long wave UV. This is particularly advantageous for stimulating certain phosphors contained on or in certain documents such as

stamps.

The thread detecting rollers 15 and 17 have been replaced by a pair of interwoven combs 102 and 104 and the encoder disc has been replaced by electronic timing circuitry 106.

Also replaced in the second embodiment is the magnetic ink detector 7. This has been replaced by a field effect tape head 108 and an external permanent magnet 110.

The second embodiment is functionally identical to the first embodiment except that the initialisation of the single chip processor is external.

The second embodiment is generally but not exclusively suited as a head for inclusion into other pieces of equipment.

It is understood that various modifications can be made to the banknote counterfeit detecting apparatus of the present invention, for example, the displays may be changed to audible buzzers or could become electronic outputs to other pieces of equipment; the single chip processor could be replaced by discreet RAM, ROM etc. The device can be programmed for discrete currencies or could as equally accept programming inputs from a more powerful piece of equipment so that a range of currencies may be interrogated. Also programming facilities can be provided such that pattern interrogration and hence denominational recognition can be realised. The drive to the slotted disc could be taken from an independent drive wheel in contact with the banknote. The apparatus of the present ivnention can be mains or battery operated.

CLAIMS:

1. A counterfeit detection apparatus for banknotes comprising a high frequency power supply (1), electrical connecting means to connect the high frequency supply to a UV lamp (9) and a metallised thread detector (14), means for detecting the amount of UV absorption, electro-mechanical means for auto-referencing the lamp intensity, means for detecting the conductivity of the metallised thread (20), means for magnetising magnetic ink and means (7) for detecting the presence of magnetic ink.

2. An apparatus as claimed in Claim 1 characterised in that it further comprises timing means (21) and a single chip processor for process control and for determination of features in a particular area of the banknote including crude pattern recognition.

3. An apparatus as claimed in Claim 1, characterised in that it comprises a DC power supply (1), a logic circuit board (5) including logic circuitry, signal conditioning circuitry and a single chip processor, said power supply operating discrete sensors via the circuit board, the means (7) for detecting the presence of magnetic ink comprises a pattern recognition sensor including a pair of semi-conductive magnetic resistors and an integral permanent magnet, the UV lamp is a shortwave UV lamp (9) monitored by a pair of silicon photodiodes (11,12) the thread detector being formed by a pair of metallic rollers (15, 17) which when rotated drive an encoder disc (21).

4. An apparatus as claimed in Claim 1, characterised in that it comprises a DC power supply (1) a logic circuit board (5) including logic circuitry, signal conditioning circuitry and a single chip processor, said power supply operating discrete sensors via the circuit board (5), the means for detecting the presence of magnetic ink comprising a field effect tape head (108) and an external permanent magnet (110), the UV lamp is a long

wave UV lamp (100) the inner surface of the quartz tube being coated with a phosphor to convert nanometers short wave to nanometers long wave and the thread detector is formed by a pair of interwoven combs (102, 104) and electronic timing circuity (106).

5. An apparatus as claimed in Claim 4, characterised in that the initialisation of the single chip processor is external.

6. An apparatus as claimed in Claim 3, characterised in that it is incorporated in a hand held device.

7. An apparatus as claimed in Claim 5, characterised in that it can be incorporated in other pieces of equipment.

8. An apparatus as claimed in any preceding claim, characterised in that it further comprises displays (31) to indicate a pass or failure of the authenticity of the banknote.

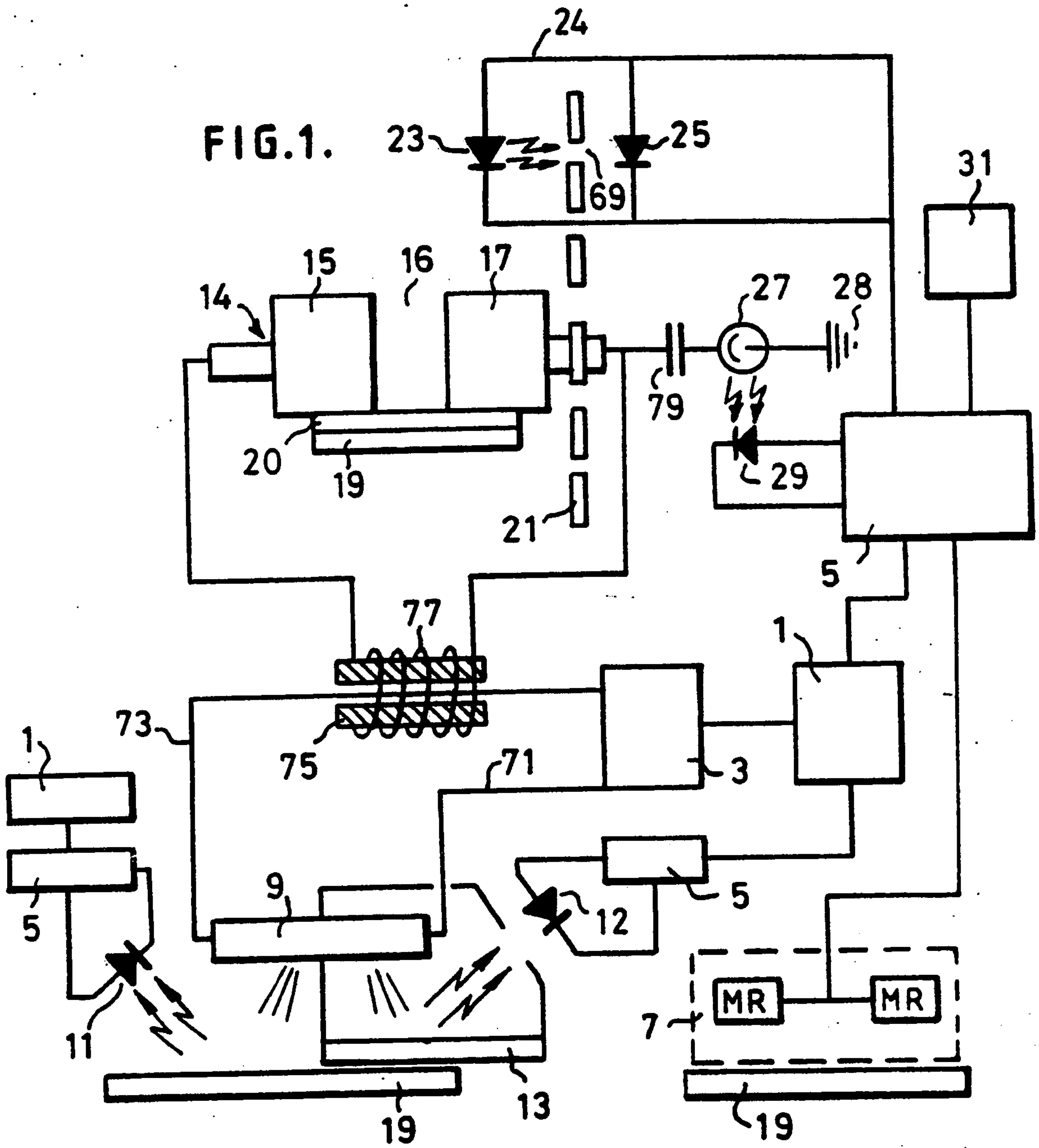
9. An apparatus as claimed in Claim 8, characterised in that the display (31) is visual.

10. An apparatus as claimed in Claim 8, characterised in that the display is an audible warning device.

11. An apparatus as claimed in Claim 3, characterised in that the rollers (15, 17) have a combined value of capacitance the resonant frequency of the apparatus being determined by the value of the capacitance.

12. An apparatus as claimed in claim 2, characterised in that it includes programming facilities to carry out pattern interrogation and denominal recognition.

FIG.1.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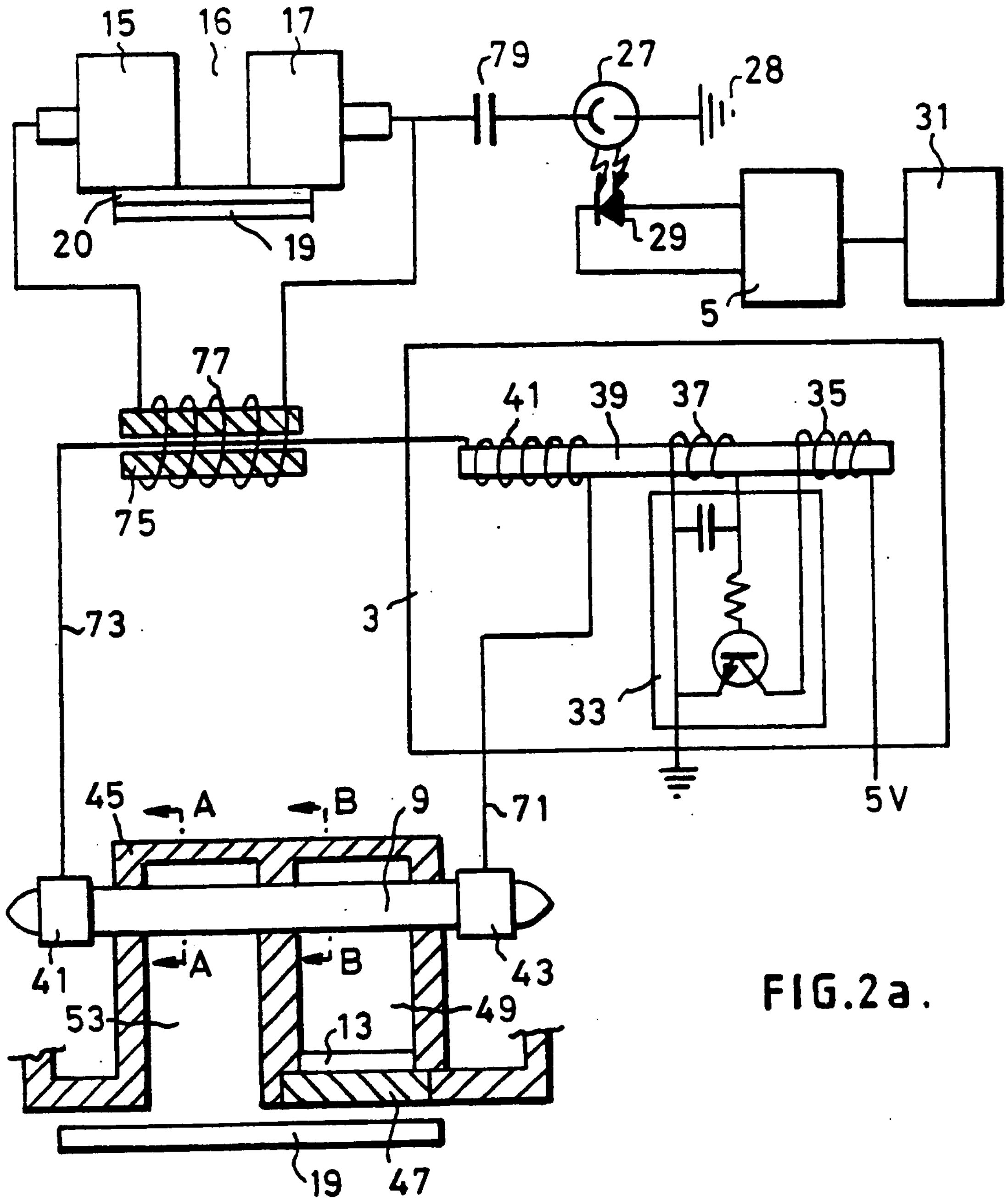


FIG.2a.

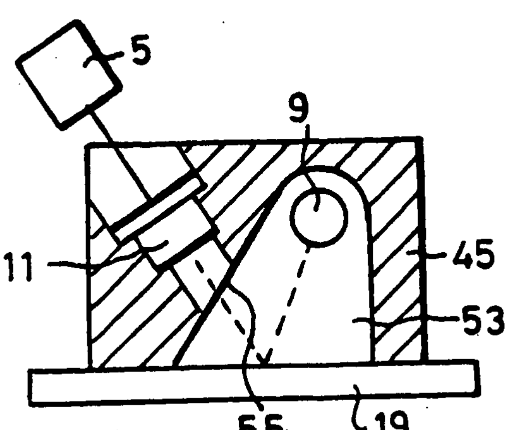


FIG.2c.

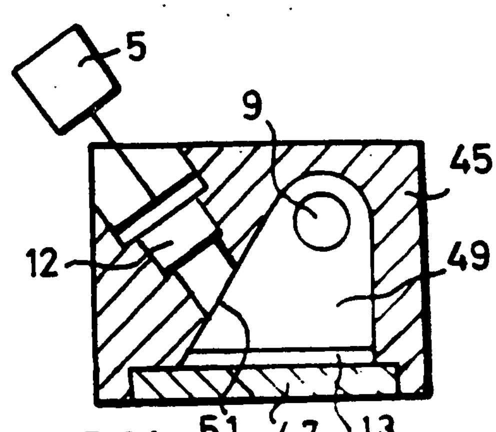


FIG.2b.

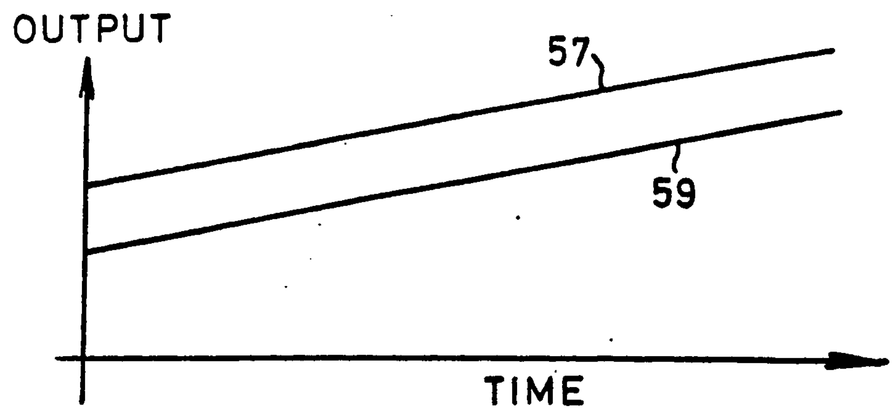


FIG.3a.

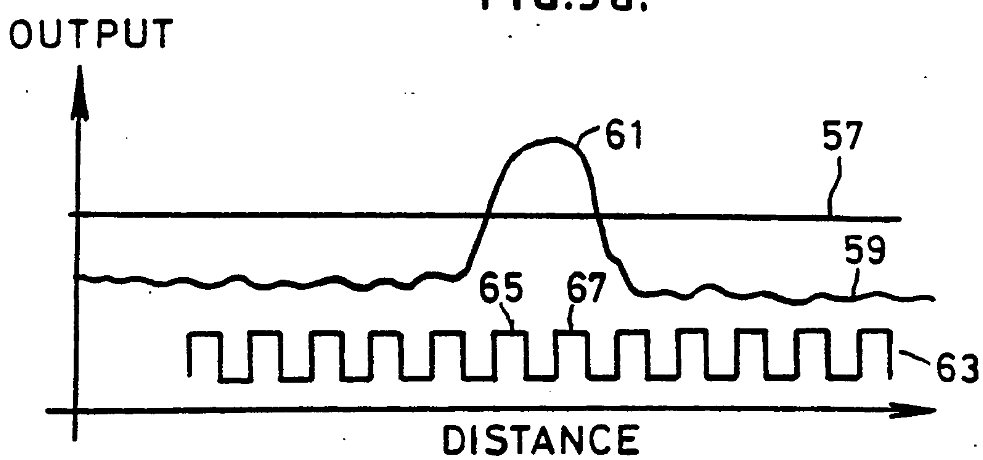


FIG.3b.

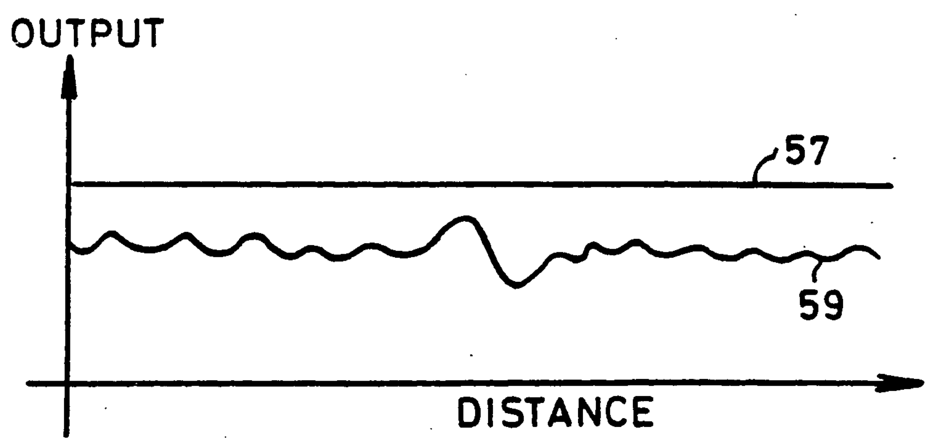


FIG.3c.

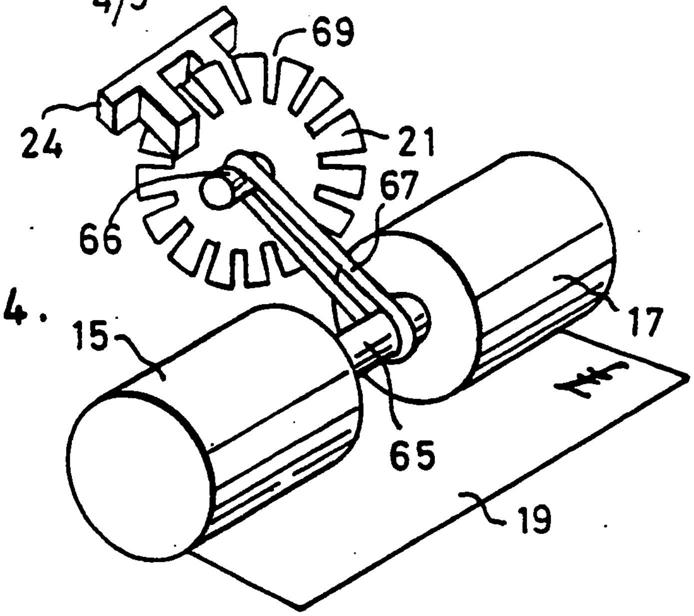


FIG.4.

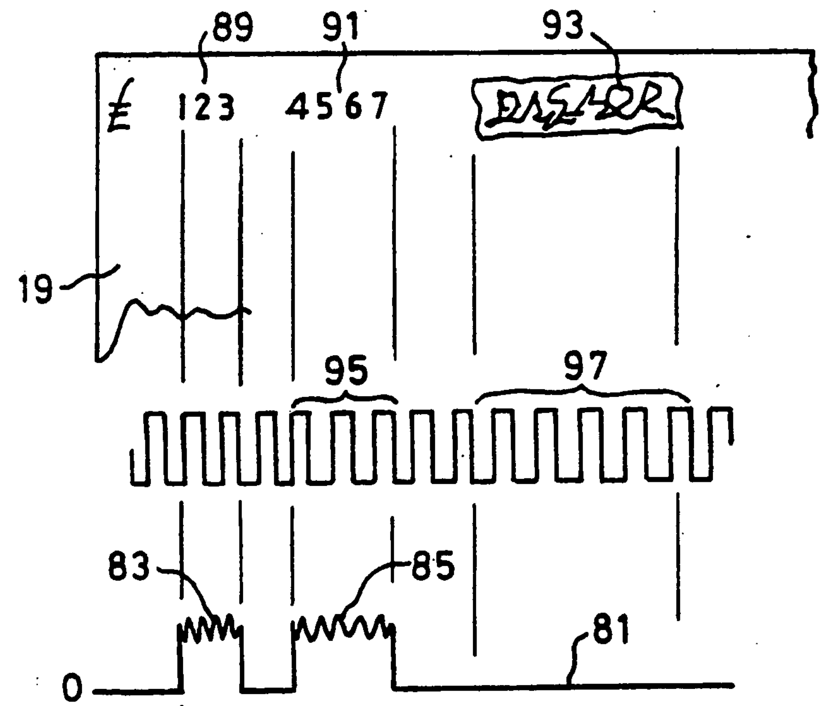


FIG.5a.

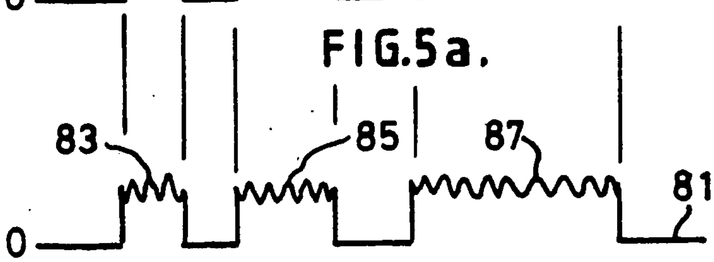


FIG.5b.

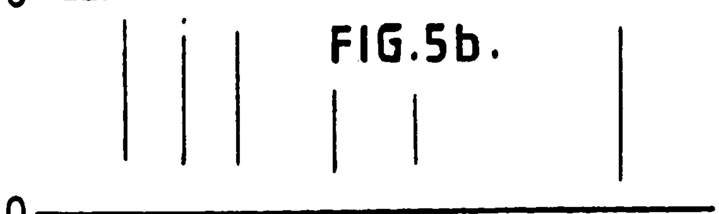
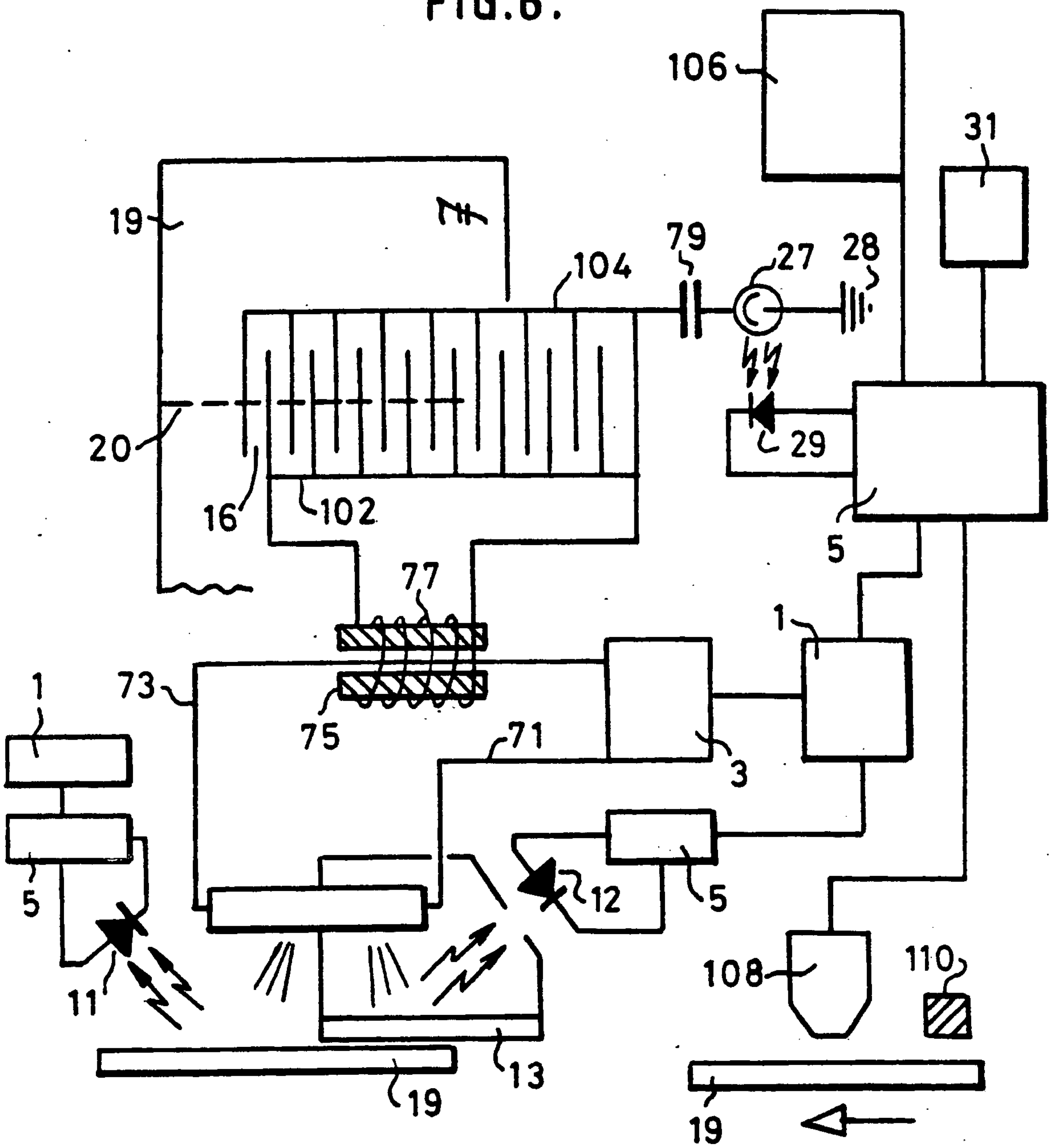


FIG.5c.

FIG.6.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INTERNATIONAL SEARCH REPORT

International Application No PCT/GB 89/01542

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) [6]

According to International Patent Classification (IPC) or to both National Classification and IPC

IPC^5: G 07 D 7/00

II. FIELDS SEARCHED

Minimum Documentation Searched [7]

Classification System	Classification Symbols
IPC^5	G 07 D, G 01 N, G 01 V, G 01 B

Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched [8]

III. DOCUMENTS CONSIDERED TO BE RELEVANT [9]

Category *	Citation of Document, [11] with indication, where appropriate, of the relevant passages [12]	Relevant to Claim No. [13]
P,A	EP, A, 0319524 (MARS) 7 June 1989, see column 4, line 48 - column 5, line 22 --	1
A	EP, A, 0101276 (UNIVERSAL) 22 February 1984, see pages 6,7 --	1
A	GB, A, 2085412 (TOKYO SHIBAURA DENKI K.K.) 28 April 1982, see abstract; page 1, lines 51-62	1

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* Special categories of cited documents: [10]

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"&" document member of the same patent family

IV. CERTIFICATION

Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report
16th March 1990	18. 04. 90
International Searching Authority	**Signature of Authorized Officer**
EUROPEAN PATENT OFFICE	M. Peis M. PEIS

Form PCT/ISA/210 (second sheet) (January 1985)

ANNEX TO THE INTERNATIONAL SEARCH REPORT ON INTERNATIONAL PATENT APPLICATION NO.

GB 8901542
SA 33185

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report.
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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP-A- 0319524	07-06-89	US-A- 4628194	09-12-86
		AU-A- 5017585	02-05-86
		CA-A- 1240059	02-08-88
		EP-A- 0178132	16-04-86
		EP-A- 0319525	07-06-89
		JP-T- 62500406	19-02-87
		WO-A- 8602476	24-04-86
EP-A- 0101276	22-02-84	JP-A- 59027383	13-02-84
		US-A- 4556140	03-12-85
GB-A- 2085412	28-04-82	JP-A- 57069377	28-04-82
		DE-A,C 3140680	13-05-82

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